



Smart Cities



Container Deposit Scheme

Pilot Project for UNDP Smart Cities

Urban Innovation Challenge

October 2018 – May 2019



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Background

UNDP Maldives with Ooredoo Maldives kickstarted the Urban Innovation Challenge in October 2018, to find innovative and sustainable solutions for three major problem areas in Hulhumale', under the Smart City Initiative; Transportation, Public Spaces and Public Littering.

Team "Eh Rufiyaa" proposed a solution for the partner organization Waste Management Corporation Organisation (WAMCO) to address the issue of public littering in Hulhumale'. The name of the project was later rebranded to "Rahdhu" which means return in Dhivehi. This rebranding was done such as to allow flexibility on the pricing on later implementation and national rollout as well as to avoid any confusions with a financial scheme rather than the objective of a container deposit scheme.

Currently, WAMCO spends MVR 1.6 million on street cleaning due to public littering. It is one of the predominant environmental issues in the Maldives, where the bulk of litter comprises of single use containers such as P.E.T and aluminum beverage containers. These single use containers once discarded on the streets and beaches, end up in the oceans threatening not only vulnerable marine ecosystems and marine life, but also affect humans through bioaccumulation in the food chain. In addition, plastic litter is unsightly on the beaches and in the oceans, and consequently, it affects the country's two largest industries, fisheries and tourism.

Objectives

The overarching intent of this project is reducing public littering caused by single use plastics. As such the main objectives of the project are as follows:

1. Reduce public littering by at least 5 % (compare with baseline data)
2. Achieve 60% collection rate of empty beverage containers (12000 empty beverage containers out of 20,000)
3. Increase number of producers and importers willing to be in the voluntary CDS scheme
4. Draft white paper for EPR Regulation and implement CDS on a national level

About the Idea/Project

About the Team

Hawwa Nashfa

Nashfa has a Msc. in Environmental Management and Policy, with BA in International Political Economy, and English Literature. Her Master's thesis was about the political, and economic feasibility of implementing a Container Deposit Scheme (CDS) for P.E.T. bottles in the Maldives, and it provided a hypothetical blueprint for implementing in the Maldives. She currently works as an Environmental and Social Safeguards Officer for the Sustainable Fisheries Resources Development Project, which is funded by the World Bank, and implemented by the Ministry of Fisheries and Agriculture. Her research expertise is in Extended Producer Responsibility (EPR), and circular economy.

<http://lup.lub.lu.se/student-papers/record/8895457>

Ahmed Afrah

Afrah is leading the activities of the waste management section in Environment Protection Agency (EPA) of the Maldives. He is highly passionate about implementing EPR in the Maldives. Afrah is also the co-proprietor of Zero Waste Maldives, an NGO that aims to raise social awareness about waste produced in our daily lives and ways to reduce it.

Ibrahim Miflal Fayaz

Miflal has a BEng First Class Honours degree in Chemical Engineering with Environmental Engineering. He currently works as an Assistant Engineer in the Coastal Protection and Disaster Risk Reduction unit in the Ministry of Environment.

Mohamed Amsal

Amsal has a MEng First Class Honours degree in Mechanical Engineering. He currently works as an Assistant Engineer in R.O. Plant Electro-Mechanical Design Department at Male' Water and Sewerage Company Pvt Ltd. (MWSC).



Research Context

The project follows up on our team member Hawwa Nashfa's master's thesis.

A master's thesis was written in 2016 for the completion of the MSc. in Environmental Management and Policy at Lund University, titled "Implementing a deposit refund system for P.E.T bottles in the Maldives - an ex-ante analysis of Political Feasibility based on the models of Kiribati and Palau". The purpose of the thesis was to propose the container deposit scheme to Maldivian policy makers and assess the feasibility of implementing the system for P.E.T bottles in the Maldives, and by wider implication for single use beverage containers such as aluminum and glass.

Nashfa conducted a stakeholder analysis of key political parties, and key waste management authorities in the Maldives to determine the political feasibility of implementing the container deposit scheme in the Maldives. For the government consultations, interviews were conducted with Deputy Minister Amir Ali, the Chief of Operations of the state-owned Waste Management Corporation WAMCO, as well as key Parliamentarians from the two major political parties of the Maldives, as well as the Vice Chancellor, and Chief Superintendent of Maldives Customs Service. Furthermore, international experts and consultants from the Pacific, as well as EPR experts from Sweden were also consulted.

Stakeholders	Type of Organisation
Ministry of Environment and Energy (Maldives)	Government
Environment Protection Agency (Maldives)	Government
Maldives Customs Service (Maldives)	Government
Maafushi Island Council (Maldives)	Local government
Maldives Water and Sewerage Company (MWSC)	Public-private company (Producer)
Coca Cola (Maldives)	Private company (Producer)
Waste Management Corporation (WAMCO) Maldives	State owned company (Waste Management)
Secure Bag Pvt. Ltd (Maldives)	Private recycling company
Biodiversity Environment Awareness Maldives (BEAM)	Non-Government Organisation (NGO) involved in PET recycling
Secretariat of the Pacific Regional Environment Programme (SPREP)	International organisation

Figure 1 List of stakeholders consulted for the master's thesis (Source: Nashfa, 2016).

Moreover, Nashfa provided a blueprint to implement the system in Male' City, and calculated the economic viability of implementing the system for 1 year, based on estimated production and import data values for P.E.T and P.E.T resin that was provided by the Maldives Customs Authority, as well as export figures from plastic recycling companies in the Maldives. A comparison was carried out on the material and financial flows of container deposit systems in Kiribati and Palau, two Small Island Developing States (SIDS), and an analysis of a mature CDS system in Sweden, which is an economically developed country. There are marked differences in how Sweden operates the system as compared to systems in Kiribati and Palau.

Feature	Pacific System	Swedish System
Deposit due	On import, and after sale	After sale
System Operator	National/State Government Private Company under contract to government	Returpack (Private Company)
Fund Manager	Treasury Department	Returpack (Private Company)
Fate of Materials Collected	Exported for recycling	Recycled by Returpack in Sweden

Figure 2 Comparison of CDS systems in Pacific islands and Swedish system (Source: Nashfa, 2016)

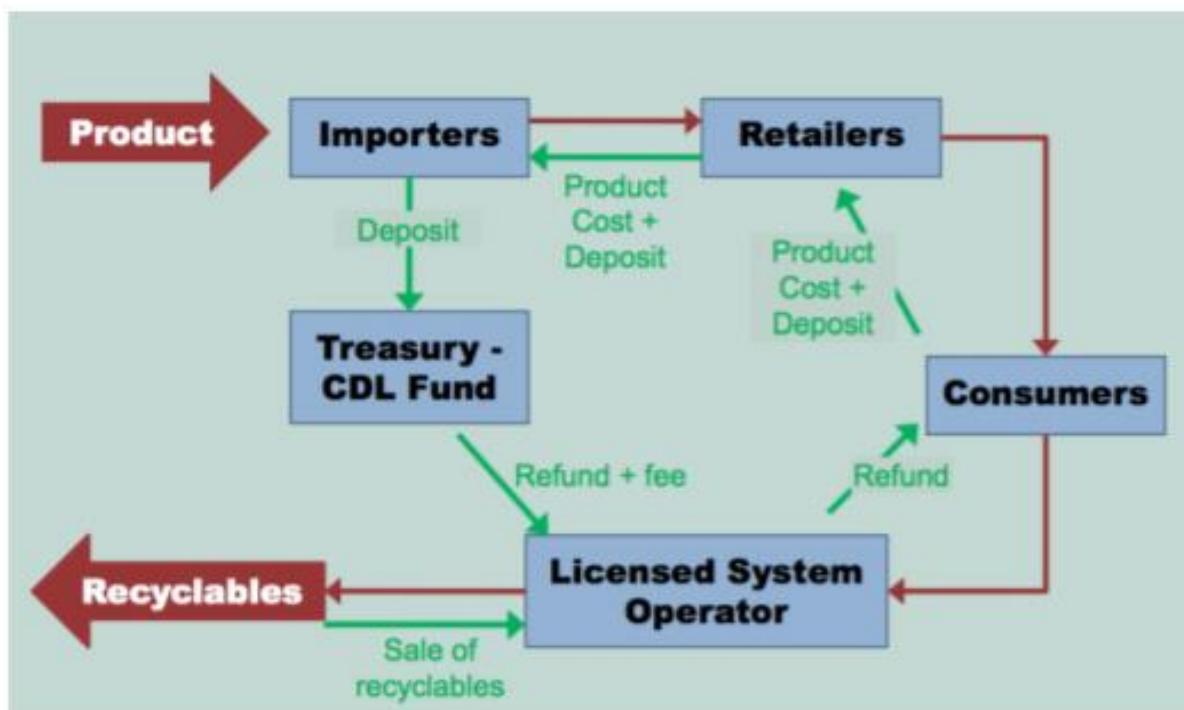


Figure 3 Typical Design of Material and Financial Flows in the Pacific Deposit Refund Systems (Source: (Richards et al., 2014)

A weakness of the paper was that a nationwide consumer survey could not be held due to the time restraints of the masters writing period. However, a thorough analysis of the systems in an OECD context, and a SIDS context were provided. Moreover, the proposed blueprint and economic costs were calculated specific to the Maldivian context.

The proposed blueprint was based similarly on the models of Kiribati and Palau, where a Special Fund is to be created under the auspices of a Container Deposit Scheme Legislation, or under Extended Producer Responsibility as according to the Waste Act of 2016. The legislation will require the creation of a Special Fund, which will be managed by WAMCO, and monitored by the Environmental Protection Agency, or the Ministry of Environment and Energy. Moreover, the legislation would require to increase the existing import duty for P.E.T bottles, and P.E.T resin and preform to increase from 20% to 25%, so that the increased 5% of the import duties is accrued into Special Fund under the Extended Producer Responsibility. The 5% of import duties will be used to provide refunds to customers once they return

empty plastic bottles, and to fund for the management of the system including provision of machinery to crush, bale the bottles, as well as to cover storage and exporting costs. This system was proposed as the blueprint, because producers and importers already pay the import duties to customs, and obliging producers and importers to pay into a Special CDS fund under a separate system may push producers and importers to escape from contributing to the Special Fund. However, under the proposed system, all P.E.T bottles empty or full, preform or resin will also be covered at point of import itself, and it will ensure that producers and importers contribute to the Special Fund under the Extended Producer Responsibility, before the entry of those products into the country. Moreover, such a top down approach has been proven to be successful in Pacific islands.

The legislation would also require that all single use P.E.T bottles are sold with a deposit placed on top of the price of the product, so that consumers pay MVR 1 additionally on top of the price of the product. Once they return this empty bottle to a designated collection point, they will be refunded the MVR 1 using the funds in the Special Fund.

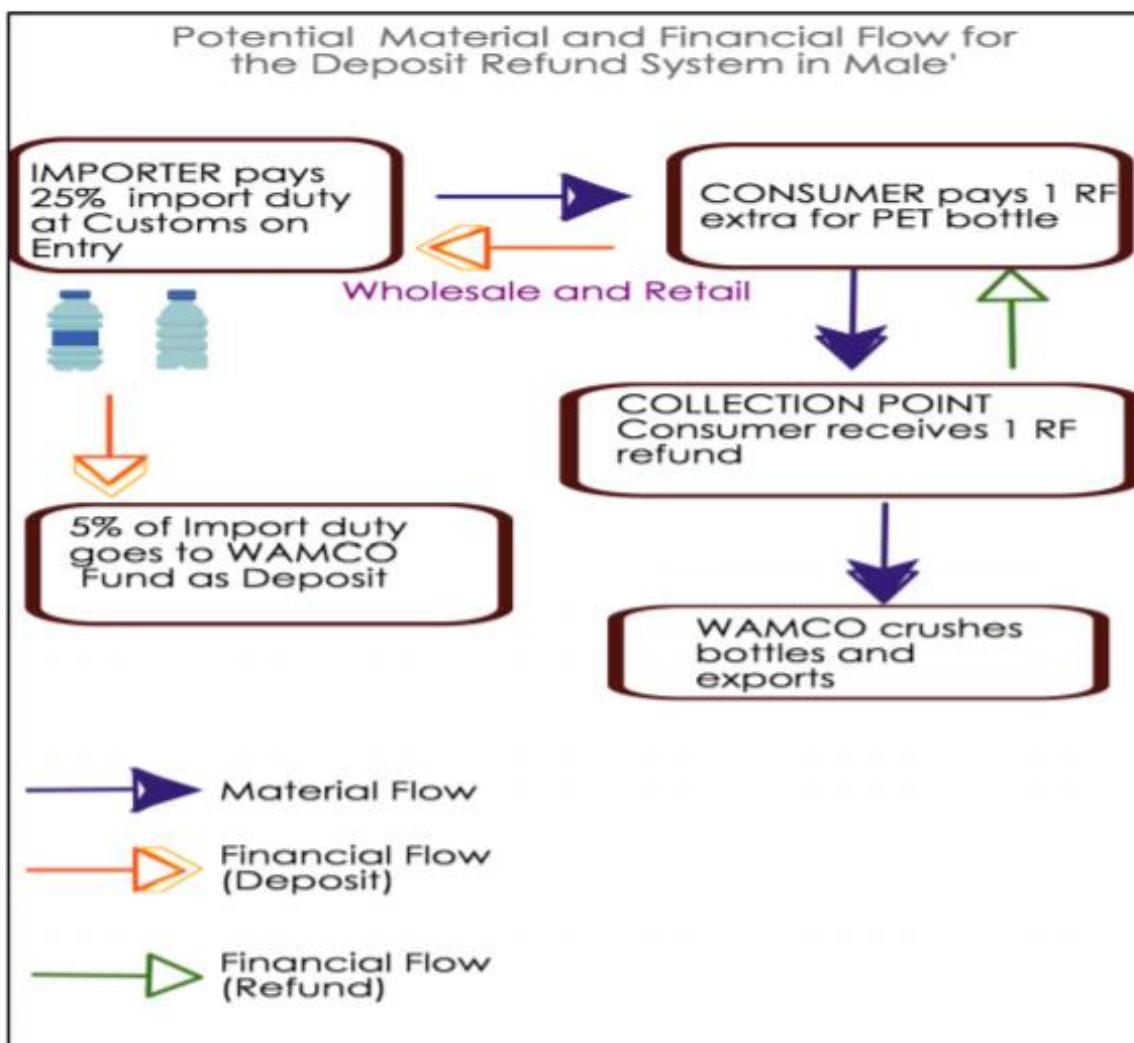


Figure 4 Potential Material and Financial Flow for the Deposit Refund System in Male'

From Paper to Real Life Application: Urban Innovation Challenge

The above hypothetical blueprint, and the concepts from the master's thesis provided the basis of developing a solution for public littering, in the UNDP Urban Innovation Challenge sponsored by Ooredoo in October and implemented by UNDP Maldives in October 2018.

Team Eh Rufiyaa brainstormed to provide a solution that met the requirements of Urban Innovation Challenge, which is to provide a solution for public littering in Hulhumale' in partnership with WAMCO. Moreover, the solution should not require legislative change, since the project duration is only 6 months, and the project outcomes and impact should reach 10% of the population in Hulhumale'.

Thereby, a solution was proposed to get voluntary participation from producers to take part in the pilot phase, and conduct stakeholder discussions regarding their willingness to be part of a Producer Responsibility Organization (PRO), in the absence of legislative change.

PRO's are the popular way of implementing EPR in many EU countries, where producers and importers collectively organise the collection and recycling mechanisms of the products they produce, at the end of life stage of the products. The PRO may take direct financial or physical responsibility for collection and recycling, or they may hire third parties. Most countries in the EU have PRO's in order to fill the legislative duties that bind nation states under Extended Producer Responsibility legislations, or under the Packaging and Waste Packaging Directive. Thereby, in EU member states, PRO's are mainly formed under legislative requirement.

Sweden is the first European country to implement the container deposit scheme, in 1982. Under the Swedish CDS, the direct economic responsibility of collection and recycling of recyclable products are borne by a Producer Responsibility Organisation (PRO) called Returpack (AB Svenska Returpack). It was established for PET bottles in 1994 (Tojo, 2011). The current ownership is shared among PET manufacturers (50%) the association of large retail chains (25%) and the association of small and individual retailers (25%) (Tojo, 2011). Returpack is responsible for the main activities of the container deposit system, and organises the collection and recycling of the products, via membership fees. Hence, the major economic and physical responsibility of post-consumer waste is borne on the producer, as importers and producers in the system (excluding single stores) are responsible to pay a yearly fee of SEK 10,000 to Returpack, for organising the main activities such as collection, and recycling of products (Nashfa, 2016). The PRO then organises amongst themselves a collection mechanism, where they collaborate with retail stores to collect and refund consumers using reverse vending machines. The bottles are then recycled by another company called Cleanaway. However, the PRO is the responsible agency for independently organising and funding all the collection and recycling activities. There is minimal government intervention, as the only responsibility of the government is to act as a supervisory authority, once Returpack passes the fees to the Swedish Board of Agriculture (Jordbruksverket, 2016). The Swedish Environment Agency is furthermore responsible for the official statistics (Returpack, 2016).

In the Urban Innovation Challenge, Team Eh Rufiyaa envisioned the creation of a PRO in the Maldives without legislation, which would require producers and importers to form a PRO voluntarily. Thereby, in the absence of a legislation, Team Eh Rufiyaa proposed the following scenario:

Proposed Solution

Team Eh Rufiyaa proposed a solution where producers will set up a voluntary PRO in the absence of legislation. In the proposed pilot, Team Eh Rufiyaa was to request producers to provide production data, and commit a total of 10,000 bottles from all three major production companies, Coca Cola, Happy Market, and MWSC, where the water bottles will then be sold in shops with a label indicating that it is part of the Eh Rufiyaa Campaign. In the proposed plan, the producers, and targeted retailers in Hulhumale' will sell the bottles with an additional deposit value of MVR 1, and once they are returned, the consumer will get refunded the equivalent MVR 1.

In the pilot phase, consumers will be refunded from the project grant money from Urban Innovation Challenge. However, Team Eh Rufiyaa had also hoped that the producers will voluntarily contribute to the refunding money pool.

Methodology of the Pilot

For clarity, the methodology is expanded to cover the lead-up to and implementation of the pilot and extensive stakeholder consultation towards both pilot and white paper creation.

Implementation of Pilot CDS

The purpose of the pilot is to promote CDS as a concept to the general public, and introduce the concept, its success in other countries, and its effectiveness as an environmental policy to the Maldivian public. As such it covers the planning, advertising and implementation of the pilot in a select neighbourhood in Hulhumale'.

Branding:

Initially presented as the Eh Rufiyaa Campaign at UIC 2018, through stakeholder consultations and consumer feedback there were concerns raised on the relevance and clarity of the name as a longer-term project once completed and handed over. Additionally, if a PRO is created it further complicates matters as the name would be stuck to a monetary value, one that is comparatively large and often confusing for consumers. To avoid such misunderstandings, the project was rebranded as "Rahdhu" which means return in Dhivehi. As such this allows more flexibility for inclusion of more than just drinking water bottles, a point reflected in the design of the logo



Design of Website:

The website was designed to be the one stop source of all the information relating to the pilot project as well as any future expansion of this same concept if we were to implement it for any other product or brand.

The site has all the vital information such as the collection point information and location as well as information on how the system work from a user perspective. While the resources necessary to do a collection-counter is built into the website, due to the rushed nature of the pilot the feature was not implemented.

Our initial intent was to include the models we developed during the Urban Innovation Challenge as part of the information that we give out through the site so that all the users would have the full picture but as this may confuse some users we decided to omit that information.

The website has the domain name Rahdhu.com (image attached in annex 2).

Social Media Creation

We did not engage as much on social media as we could have. But we were able to reach a very wide audience as the launch of the pilot made national news as it was covered by almost all major news agencies in the country both digital media as well as TV. (image attached in annex 2).

We have a small presence on Facebook (fb.com/Rahdhu) but our Twitter handle is inactive, and we were unable to get Rahdhu as a handle as someone else had already taken that account. Consequently, we have RahdhuMv has our twitter handle.

The highest post reach we received from Facebook was 3,279 people.

*Design of the CDS pilot system**Target product:*

For the pilot, the focus was 500ml and 1500 ml single use plastic water bottles, as they are the main constituents of litter on the streets. Our initial assessments indicated that 5000ml bottles used mostly in households are mostly handed over to WAMCO during their daily collection of household waste rather than littered on the streets. The smaller 500ml and 1500 ml bottles were identified in our site surveys and stakeholder consultations as the major source of terrestrial litter.

Tracking of bottles (Stickers):

All the producers had mentioned during the stakeholder consultations said that it would be impossible for them to alter the label or the bottle for such a small volume of bottles that we needed for the pilot. Therefore, the sticker was the best most cost-effective option that we could come up with. A total of 10,000 waterproof stickers, printed on PVC material were ordered from China with the specific requirements, so that it will hold up to the condensation that will form on bottles that are taken from the fridges in the stores. The sticker has details on where to return the bottles, including hotline for people to call with queries that they may have regarding the bottles that are part of the pilot (image attached in annex 2).

Locations of bottle output:

Initially we were going to pilot using the two Redwave stores (Biggest retail chain in Hulhumale) as the output locations for water bottles for the pilot. A discussion was held where Redwave would sell the water bottles with an MVR 1 increase, and with Eh Rufiyaa Campaign sticker on the bottles. However, due to last minute changes, and logistic issues, Team Eh Rufiyaa resorted to using 7 retail shops around the vicinity of WAMCO front office in Hulhumale. The 7 shops are listed below:

1. Famdaaz International
2. Dakaa Mart
3. Mamak
4. ANU Mart
5. Fahi Plaza
6. Olive Tree
7. Kuzo

Team Eh Rufiyaa did face to face dialogues with the shop owners and attempted to gain the support of the 7 shops listed above, where they agreed to sell the bottles with the stickers on. However, the required MVR 1 deposit was not added to the price of the bottles. Thereby, the bottles were sold without the price increase. This goes against the CDS concept, as consumer burden should be incorporated into the system. Thereby, this is a considerable flaw in the implementation of the pilot.

Collection Point and Refunding Mechanism:

WAMCO Front office in Hulhumale was decided as the collection and refund point (image attached in annex 2). The location is central in Hulhumale, and it is accessible to the target population. Once the empty bottles with the stickers are returned to WAMCO, WAMCO cashiers will refund the consumers, using the Urban Innovation Challenge grant money. The staff will also tally the bottles so that the refund amount matches the amount of bottles received. They will also confirm that refunds are only provided for bottles with our sticker on them.

Stakeholder Consultations

The following section lists meetings that the team has had throughout the duration of the project.

Parley [17th January 2019]

Met Shahina and Hulwa from Parley. As Parley operates on a model where the consumers return bottles based on their environmental awareness and good will, an implementation of a CDS scheme would break apart the whole model they have built for so long and consequently it is the biggest hesitation from Parley towards the CDS scheme.

They will however support us by accepting all the plastic that we collect so that it can be sent off to recycling in Taiwan. However, a financial model is something that they do not want to be affiliated with and has made that very clear to us and we did not use any of their branded jumbos in the collection efforts.

Minister of Environment [23rd December 2018]

We met the Minister of Environment Dr. Hussain Rasheed Hassan, EPA Deputy Director General Ibrahim Mohamed, Ministry of Environment's Waste Department Director General Ahmed Murthaza and Permanent Secretary Ajwad Musthafa.

We explained the concept of CDS to the Ministry and got their feedback on implementation of the scheme nationally. Minister was very interested in the scheme and his view on the whole concept was that consumers should not face any financial burden and that the producers should pay for the deposit entirely and wanted us to figure out a way to implement the scheme without the consumers seeing any price increase.

Ajwad Mustafa also pointed out to us that a national fund for a container deposit scheme could be possible under the Green Fund as a separate account.

The Ministry does want this fund to be managed outside the scope of the environment ministry as they were a bit reluctant to take on this additional management work.

Civil society and NGO's [23rd January 2019]

We got a good turnout of nationally active NGO's to attend the information session: BeLeaf, Ecocare, Hulhumale Anhenunge Jamiyya, Live and Learn Environment. All were very supportive and in favour of the project, including long terms plans to establish CDS in the country. They also raised the question of why only plastic was the scope of the project, but they understood that due to the time and financial restrictions of the pilot it would be difficult to implement for all the different types of containers.

MWSC

We've met MWSC on several occasions and every time they are very much for a nationally implemented CDS scheme. This is due to the fact that they have invested quite a bit of money into reverse vending machines as part of their CSR initiatives but without much success due to the lack of a nationally implemented CDS scheme.

All producers [3rd March 2019]

We met all the largest bottled water manufacturers; Coca Cola that produces Bonaqua and Aquarius, Happy Market who owns Island Beverages Maldives which produces Life and the state owned MWSC that produces Taza.

We briefed all the producers on how the scheme would work and if they were against or for such a scheme and discussed about setting up a Producer Responsibility Organisation. This whole discussion was very positive and when we asked for data such as Production Data and their Total Production Capacity as well as pricing per bottle and cases of water all the producers agreed to send the data once there was a formal written request for the data.

We sent in those formal letters through the Environmental Protection Agency but only Happy Market responded to the letter with production data they did so within 2 days. The rest have yet to submit any data.

BHM: [30th January 2019]

We had met with BHM previously as well. They have always been very keen on implementing this type of scheme for XL brand energy drinks and we were very interested to have them onboard as well since compared to plastic aluminium cans would be a more lucrative waste stream to collect and send for recycling.

BHM setup a meeting with XL's Region Manager and we explained the model to him, and we will most probably look into how we can implement this just with XL once the pilot is completed.

WAMCO[11th April 2019, 22nd April 2019]

A final meeting with WAMCO was held to discuss and finalize all the logistics and resources needed for the launch and the pilot. It was decided to carry out the launch as a press conference with someone from the senior management of WAMCO returning the first bottle to launch the pilot.

WAMCO also agreed to provide support for poster design and printing along with providing the necessary staff and space for a collection point to be set up at their front office and transfer station in Hulhumale'.

Redwave [1st April 2019, 23rd April 2019]

We initially approached Redwave hoping to pitch them as the sole retailer for the pilot as they have very central locations which are frequented by a large majority of the population and their Point of Sale (POS) system would allow us to ascertain the rate and date of sales and subsequent approximation of time to return. This along with the scale of business and operations data would have greatly increased the quality of data generated from the pilot.

While initial response was overwhelmingly positive and on board for the pilot, they later rescinded support for the project, citing difficulties in entering the participating bottles into the POS system as it is controlled centrally throughout their entire franchise. This was a concern that we raised in our initial meeting but was promptly allayed stating that it could be entered into the system as a sale item. In our latter meeting this logistical issue meant that we had no choice but to forgo our initial pilot plan, delay implementation and shorten pilot period.

Legal Counsel: Ms. Shabab Rasheed [28th January 2019]

Shabab who has worked on almost all the legislation related to waste management in the country was our legal aid in this pilot. She gave us all the details regarding what can be done to implement this scheme nationally. Her suggestion was that we should try and implement this within the waste regulation by stretching the legal boundaries of a regulation as the Waste Act has been stalled in Majlis since 2016.

Discussions and requests for data:

During all the stakeholder meetings conducted with the largest producers of water bottles in the Maldives; Coca Cola, MWSC and Happy Market, all three producers agreed that they will support the project and provide all the data that was required for the project. One of the most important data that was requested was the production data. This is because production data and volume are necessary if a national level system is designed to capture high collection of empty bottles for recycling. The correct statistics for production and import are required because national targets for collection and recycling have to be set. Moreover, correct baseline information is required to measured impact from CDS, and measure progress in collection rates.

Team Eh Rufiyaa sent official letters to the producers, which were signed by the Deputy Director General of the Environmental Protection Agency. However, only Happy Market provided us with data in a timely manner. Coca Cola and MWSC have yet to provide us with any data, and this has hindered progress and also will affect the white paper that we will be writing as it will have to be based on assumptions rather than on the ground facts. It is also important to note that all the producers were reluctant to provide actual production data, and only agreed to provide estimates.

An official request was also sent to Maldives Customs Service, requesting import data for P.E.T for the past five years, and they provided the data to Team Eh Rufiyaa. The data can be found in Annex ... Nevertheless, are data discrepancies and inaccuracies in the Customs data, which can be read in detail here <http://lup.lub.lu.se/student-papers/record/8895457>.

BHM Traders who is the sole distributor for XL Energy drinks was also a stakeholder during this pilot, as they are one the largest importers of aluminium canned beverages. They were very much onboard with the CDS idea and were willing to provide any support that we needed. They also facilitated a meeting with XL's Country Manager who was also very receptive to implementing a CDS scheme to collect aluminium cans. But, as the pilot's scope was set to just single use plastic water bottles, we did not engage them further in the pilot phase, but they will be a key partner if this is taken to a national level.

Consumer Survey:

A survey was conducted initially during the Urban Innovation Challenge in October 2018, where over 100 responses were received, with 80% favouring the setup of a CDS in Maldives and indicating willingness to return the bottles for a monetary incentive. In February 2019, another survey was launched that aimed to get consumer and household consumption data. However, only 50 responses were gained, which is not a representative sample. The goal is to continue the data collection until the draft of the white paper.

Draft White Paper, recommendation for EPR and CDS implementation to government

The white paper will be presented to the Minister and Policy team at President Office after the completion of the pilot phase, with the findings and recommendations.

Budgeting and Cost Allocation Breakdown

Table 1 Budgeted and Actual Expenditure

Team Eh Rufiyaa		
Budgeted Expenditure		
No.	Description	Spent Amount
1	Marketing and Awareness: Website, Stickers and Posters	20000
2	Deposit Injection: Refunds for Bottles Returned	10000
3	Food	4000
4	Travel: Fuel, Taxis	3000
5	Labour	18000
6	Consultation Fee [4 members total]	20000
Total Expenditure		75000

Findings from the Pilot

Stakeholder Consultations

Most of the target stakeholders were reached during the pilot phase.

Government and Policy Makers:

A key achievement was gaining the audience of the Minister of Environment and senior staff of the Ministry to pitch the project idea. The government welcomed the idea of a CDS and mentioned that Team Eh Rufiyaa is welcome to submit a white paper for legislation, and moreover mentioned that they are willing to provide technical support in establishing such a system in the country. However, the Minister was opposed to including a deposit in the price of the product, because he believes that raising the price of water would be a politically sensitive issue, in a country that needs to rely on desalinated water for drinking water needs, especially since provision of water falls under the mandate of the Ministry of Environment. Therefore, he mentioned that he would rather sell the bottles at the existing price, but still enforce Extended Producer Responsibility on the producers, so that they provide incentives for consumers to return the bottles. He also stated that a preference to how the system should be managed and that is with as little intervention from the Ministry's side, so this to us translated as a PRO or at least a state owned PRO that WAMCO has a high stake in as all the waste collected will eventually have to be soundly managed by WAMCO. The Ministry also highlighted that a CDS Fund can be established under the already functional Green Fund, but under a separate account.

Producers:

Team Eh Rufiyaa conducted stakeholder consultations with all major producers in the country. Initial discussions with all the 3 major stakeholders in terms of local producers were very positive. In our meeting with producers of Taza, Life and Bonaqua all agreed that they would share their production data and all other data that we requested. However even at the final stages of the project only the producers of Life has shared their data with us, that too an estimate rather than actual production figures. As mentioned above, to ascertain any potential impact of the pilot and possible scale up, establishing a baseline for the production of single use Plastic bottles in the country is imperative and part of our directive.

The Government estimates production to be around 280,000 bottles per day, but our estimates (and their maximum capacities suggested in our meeting) suggest that it is closer to 350,000 bottles. The lack of

transparency of production data from Coca Cola was not surprising but not getting cooperation from the state-owned enterprise MWSC (Taza) was very disappointing. The production and import data is imperative, in order to set target collection, and consequent recycling rates. ;

Legal Consultation:

We met with the legal expert, Shabab Rasheed who had drafted the Waste Act that was submitted to the Parliament in 2016. We sought legal advice on establishing Extended Producer Responsibility in the country, and the mechanism to set up a Special Fund that is managed by a Producer Responsibility Organisation, or by the state. The aim was that it will facilitate smoother transition from completion of pilot and handover the project to WAMCO delete this. However from legal consultation we discovered that this would be a very lengthy process and would not be worthwhile to keep as part of the scope of project. Moreover, without producer willingness and without legislative backup, it seemed futile to set up a PRO during the pilot phase, since the entire purpose of the PRO is that is collectively owned by producers, and the responsibility is borne by the producers.

It would be better to take on this task once the buy in from the relevant ministries are gotten. Otherwise the chance of failure is extremely high especially when the market is extremely competitive. This is of particular note as most countries that have established CDS schemes practice Manufacturer Suggested Retail Prices (MSRP) as a component of antitrust legislation. The lack of this component allows retailers to adjust their margins and could possibly lead to varied fluctuation of prices in different areas and as such undermine the uniform increase in price.

Government regulation of pricing may be required for the mechanism to work, a sentiment echoed by the Current Environment Minister in our meeting (image attached in annex 2). Consequently, government would essentially have to push the producers into setting up a PRO rather than let them set it up on their own

Feedback from Parley:

Parley is a key organisation involved in the collection of plastics and export them to the Adidas Facility in Taiwan. Parley was very much against providing monetary incentives for the return of empty bottles. Their model is based on appealing to the good conscience of the consumer using awareness about the benefits of plastic recycling, and the negative effects of marine littering. However, they were open to accepting any collected bottles from the pilot phase, given that no public mention is made that Parley is supporting the project. They are however open to other indirect incentives such as paying for water bills, school bills, funding for baling machines in islands, and contributing to waste management projects in schools and other islands.

NGO's:

We met with Save the Beach, Live and Learn Environment Maldives, Women's Association of Hulhumale, and EcoCare. They all supported the idea of CDS legislation in the Maldives. All of whom shared with us their experiences in dealing with communities and government bodies regarding environmental issues and key areas of pushback in implementing environmentally conscious programmes.

Consumer Survey:

There needs to be an extensive nationwide consumer survey conducted in order to get a representative sample of the whole country, that is willing to accept CDS as a national legislation for single use products.

Outcome of the Pilot

We ran the pilot from 30th of April till 4th of May Midnight. We engaged over 12 shops and 6 cafes to do the retail distribution of the bottles.

We had the issue of 2 holidays that were in the pilot duration that meant that the WAMCO front office would be closed. 1st of May, Mayday was a public holiday as well as WAMCO front office is closed on Fridays. So no collection happened on those days at the front office. We then engaged the WAMCO transfer station as a collection point as well as we found out that that site would be open from 8am till 12am every day.

As mentioned above, a grand total of 10000 stickers were handed out. Of those the overall per day collection outcome for the days is shown below in Table 2.

Table 2 Total Per Day Collection Tally for Pilot Project

Date	Day	WAMCO Front Office	WAMCO Transfer Station	Daily Total
30th April 2019	Tuesday	82	0	82
1st May 2019	Wednesday	Public Holiday	0	0
2nd May 2019	Thursday	426	0	426
3rd May 2019	Friday	Office Closed	466	466
4th May 2019	Saturday	3512	3657	7169
	Total	4020	4123	8143

This is a 81.43% return rate. The target set for 60% percent recovery has been achieved.



Figure 5 Collected bottles tallied and in process of preparation for handover to Parley

WAMCO Collection staff tallied the collections by batches throughout the collection days and the tallies of each day are shown below in Table 3 and Table 4

Table 3 Tally of Collected Bottles at the WAMCO Front Office

Collection at WAMCO Front Office			
Received Batch	500 ml bottles	1500 ml bottles	Total bottles
1		1	2
2	63	17	80
3	122	25	147
4	256	23	279
5	339	114	453
6	169	20	189
7	800	420	1220
8	93	10	103
9	400	150	550
10	500	150	650
11	247	100	347
	Total Collection		4020

Table 4 Tally of Collected Bottles at the WAMCO Transfer Station

Collection at WAMCO Transfer Station			
Received Batch	500 ml bottles	1500 ml bottles	Total bottles
1	376	90	466
2	168	95	263
3	1422	290	1712
4	89	14	103
5	202	293	495
6	191	54	245
7	50	200	250
8	285	194	470
9	25	85	110
	Total Collection		4123
	Total Collection from both sites as of Saturday 0000		8143

Bottle Tracking:

We initially engaged Redwave as they are the biggest retail chain in Hulhumale' and has 2 major stores with a lot of foot traffic and combined they reported to us that they move over 10,000 bottles of drinking water a day. So, it seemed a lot easier for everyone involved to run the pilot through those 2 locations. This would've allowed us price control as well as very strict monitoring of the results. However, at the last minute Redwave decided to not go ahead with supporting the pilot and this initial plan fell apart. This was on the 23th of April. Price control and monitoring as well as getting new vendors onboard for a price hike would've been impossible so we decided that the best move would be to pivot the pilot to see if incentivised collection would work.

The retailers then were more than happy to cooperate with us. When we did distribute all the stickers to the shops and cafe's what we noticed was that the stickers were left idle without being put on the bottles for almost a day or so. We then decided that we would do the labeling ourselves and put up stickers in whatever bottles we could so that the bottles with stickers would get into circulation as fast as possible.

The delay in return of the bottles was felt due to this mishap as the first day of collection we only received 82 bottles back.

It also took a while for all the shops to put out their allocated quota of bottles with stickers as many of them sold cases of water bottles but they were unable to individually label the bottles in the cases as that would mean opening the cases and thus it would be impossible to transport those cases of bottled water. So, most of the sales were individual bottles with stickers. A consequence of this is that there is no statistical significance to the types of bottles returned.

Consumer Behaviour

We received over 200 calls from individuals who wanted to learn more about the pilot project and how they can return the bottles to receive a refund. A lot of questions about why 5 litre bottles were not part of the pilot were raised. Since our initial assessment suggested that 5 litre bottles don't make up a significant portion of the litter we left those bottles out.

More questions about if other containers that are not plastic could be returned were also posed. To which we responded by saying that for the purpose of this pilot we are only focused on the plastic bottles, but this can be expanded if needed to aluminium, glass or other materials.

Almost all the calls were positive and when asked if they would return a bottle for even a lower refund amount the majority of the responses were positive. This maybe due to the fact that most of the people that are concerned with plastic pollution were calling in to find out more about the project.

With the scope of the pilot being quite small and restricted to a particular area it was very challenging for us to really gauge individual customer behaviour, but almost all the customers we observed while putting up stickers on bottles at shops did ask about what the project is about and how the bottles can be returned to the cashiers at the shops.

We also engaged HDC's municipal team that does daily road cleanings to see if any of the bottles ended up as litter, we managed to get back over 92 bottles through this. This we assume were thrown away as litter though there was an incentive attached to the bottle as well.

Collection and Refunding

Over the counter collection as we tested out in this pilot is somewhat difficult to handle as we would need more staff to check the bottles for stickers and count them before they are refunded and this took quite a bit of time in some cases when people brought bottles in bulk. The time delay in verifying the bottle amounts and making the transaction for the refund was a complaint that we did receive and maybe a hindrance.

WAMCO staff had to work overtime to tally the returned bottles, and refund consumers who returned empty bottles. In the case a CDS system is established, the Special Fund will be used to cover the additional costs of labour and machinery used to finance the work. Therefore, an additional administrative function needs to be added to WAMCO, whereby the administrative burden needs to be then calculated.

The implications for WAMCO to be involved depend on the how the CDS is implemented in the country. If the collection and recycling are organised by a PRO, then WAMCO doesn't have to bear the burden.

Drafting of White Paper, recommendation for EPR and CDS implementation to government

The Waste Management Act that gives power to establish and enforce an Extended Producer Responsibility Regulation has been stuck at Majlis approval stage for sometime since 2016. However, there exists no guideline or regulation on the implementation mechanism for EPR in the country, for any product category. Thereby, a whitepaper for single use packaging that outlines an implementation mechanism for EPR, using CDS as an environmental policy would be beneficial for the country in terms of environmental policy prescription.

We met the Minister of Environment, Dr. Hussain Rasheed Hassan and his senior staff and briefed them on our plans and from that we learned that even without the Waste Act in place there were still some avenues we could explore that may allow us to setup the Container Deposit Scheme in the Maldives.

This was also backed up by the lawyer that we met who mentioned that we'd just have to push the legal boundaries provided by the waste management regulation if the Waste Act doesn't come into effect.

The government does have a preference to how the system should be managed and that is with as little intervention from the Ministry's side, so this to us translated as a PRO or at least a state owned PRO that WAMCO has a high stake in as all the waste collected will eventually have to be soundly managed by WAMCO. The Ministry also highlighted that a CDS Fund can be established under the already functional Green Fund under a separate account.

Challenges/Limitations

Duration of the pilot phase:

Our biggest hurdle was the government changeover post elections, that resulted in the SOE HDC and WAMCO who are our partners on the project to be quite unstable as they both lacked an MD for quite a long time which lost us quite a bit of valuable time at a critical point which did cause a significant loss of momentum.

Financial restraint:

Another challenge has been finances. MVR 75,000 is a very limited budget to run this pilot at scale to reflect the feasibility to scale to a national roll out. As discovered through the course of the project, the major players in the industry excluding smaller manufacturers, produce 350,000 bottles daily. Considering this scale, a perfect return percentage would only yield 2.85% of a day and would not achieve a significant impact towards the goal of 5% reduction.

Location:

Due to the nature of the study and available resources, Huhlumale' also is not an ideal location for such a pilot project. Establishing a baseline on how much actually leaks into the environment would be better accomplished in a less populated area such as Villingili as well as much better community engagement throughout the island than the significant but localized pockets of the community that are accessible to the pilot retailers and collection points.

Lack of production and import data, and waste data:

The country does not have production and import data, and moreover also does not have accurate data on plastic waste stream. This proved to be challenging for us in establishing the baseline, establishing target collection and recycling rates.

Lack of support from the producers:

A key issue was the lack of support from the producers, namely Coca Cola and MWSC (Taza) being unresponsive to our requests. Even after we met them in person and had their verbal agreement for almost everything we requested for in writing. This will result in the data being incomplete. We feel that this is an intentional sabotage from their side as if this project does succeed this will bring a considerable financial burden on them as they will have to abide by an EPR rather than be allowed to flood the market with single use plastic without any consequences.

Challenges in setting up design of CDS:

This was the most difficult part since it is very difficult to get all producers on board without actual legislation. Moreover, we had to debate quite a bit regarding involvement of retailers, how many retailers, and their exact role in the pilot phase. This is as, in mature CDS systems, retailers play an important informative and physical role in collection and refunding. However, in the Pacific systems, retailers play a rather passive role, and only sell the bottles with the deposit placed on top of the price of the product.

However, for this pilot, we needed also the retailers to sell an agreed number of bottles with the increased price. That is the ideal situation to test how consumers respond to the burden of price increase, especially when only bottles with the sticker are sold at an increased price. However, ultimately the bottles had to be sold without the deposit, and 7 retailers we involved in the pilot phase, rather than the envisioned 1 large retailer. This has both pros and cons, as it showed that more retailers were interested in participating in the pilot. However, it also made it more difficult to monitor, than if it was from a single retailer. Of note is the transaction dates and volumes; ie, the number of bottles sold within a particular day and the number

of those bottles that had stickers applied. Our observations during the pilot was that even though the stickers were given to the retailers, they only applied them to bottles at their convenience. Some had the stickers, others did not. As a result, a conclusive link cannot be established to how many bottles were sold at a particular date and of those how many were returned in the 3-day window; would it have been faster if more had stickers applied or would it not have.

Recommendations and Conclusion

Our recommendation to the government is that there be regulatory framework setup so that there is at the very least monthly reporting of production and import of single use plastic bottles in the Maldives. In order to capture the full value of imported P.E.T into the Maldives, it is also necessary to collaborate with the Maldives Customs Service, and include additional functions on monitoring the import of single use products into the country. To let all these bottled water producers, manufacture at their current rates without regulation or any EPR is a colossal oversight from the government.

Increase sample size to be a significant size to be able to trial with all bottle manufacturers as part of a manufacturing batch. It would also be most ideal to have the labels changed and maybe even a custom barcode so that all the Point Of Sale Systems can add it as a different item to reflect an easy price change this way the retail stores as well as the consumers have it a lot easier to identify the bottles that are part of the pilot. Putting stickers on the bottles is very labour intensive and takes a lot of time to deploy.

Collection systems also could be improved with some form of a table that would allow for more ergonomic counting for larger number of bottles that are returned in bulk. A reverse vending machine for a pilot is an unreasonable ask as a machine costs Upwards of MVR 1 Million and we'd have to supply one to almost all islands and yet they can only retain less than 600 bottles.

We'd also recommend that we do not allow plastic bottle manufacturers to self-regulate as without any proper oversight we will see this fail. No regulation in Maldives has been enforced to the extent that it would have a positive impact. Single use plastic pollution that leaks into the environment having the largest negative economic impact on biodiversity, tourism, fisheries and health letting producers self-regulate will have a very negative impact on the publicity as well as the long term success of such an initiative.

In conclusion, regardless of the shortcomings of the CDS pilot and non-cooperation of producers, the pilot has been a resounding success with 81% return rates; exceeding our target of 60% return rate. We would like to express our deepest gratitude to our focal point at UNDP, Aminath Shaliny and later Aysha Junaina Faisal for the endless support and guidance throughout the entirety of the project.

If the pilot could have been run for the planned 5 days we are confident that we would have achieved a greater return rate. The results of the pilot establish that consumers, retailers and small businesses especially are interested and onboard with a project such as ours. The consumers are ready to take responsibility, now its time for the producers.

Annex (Additional Documents)

1. References

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2. Photos and Media

This section contains images from key activities carried out over the course of the pilot and is referenced throughout this report but is collated here for brevity



Figure 6 Meeting with Ministry of Environment

RAHDHU රාඛදු

Rahdhu, is the Dhivehi term for Return. Which is the core of what we aim to accomplish with a Deposit Refund Scheme; to get consumers to safely dispose of their single use containers. In essence return them, so that they can be collected for recycling instead of being landfilled or openly burnt.

WHAT WE PLAN TO DO

Pilot a Deposit Refund Scheme in Hulhumale' to see if we can collect back 10,000 empty containers which would be incentivized for return.

Hulhumale WAMCO Front Office

WAMCO Customer Front Huvandhunmas Hingun, Malé

Map showing the location of WAMCO Customer Front in Hulhumale, Malé, with nearby landmarks like King's Garden, Hulhumale Hospital, and the Eastern Beach.

Where can I return my bottles?

RAHDHU

Hulhumale WAMCO Front Office

WAMCO Customer Front

Map data ©2019 Google Terms of Use

Figure 7 Design of the Website



Figure 8 Clippings of General Media Posts Regarding Launch



Figure 10 Location of Collection



Figure 9 Promoted Social Media Post



Figure 11 Poster Placed at each of the Retail Locations



Figure 13 Mid-Day Tally at Collection Point



Figure 12 Conditions of the Bottles Returned